# Circle Theorems (5) Geometric Reasoning

## Do now:

**Circle Theorems pile-up #1**
Diagram **NOT** drawn accurately

58°

96°

82°

d

26°

f
f

c

e

a

i

b

18°

152°

h

https://www.tes.com/member/keyboardmonkey

g
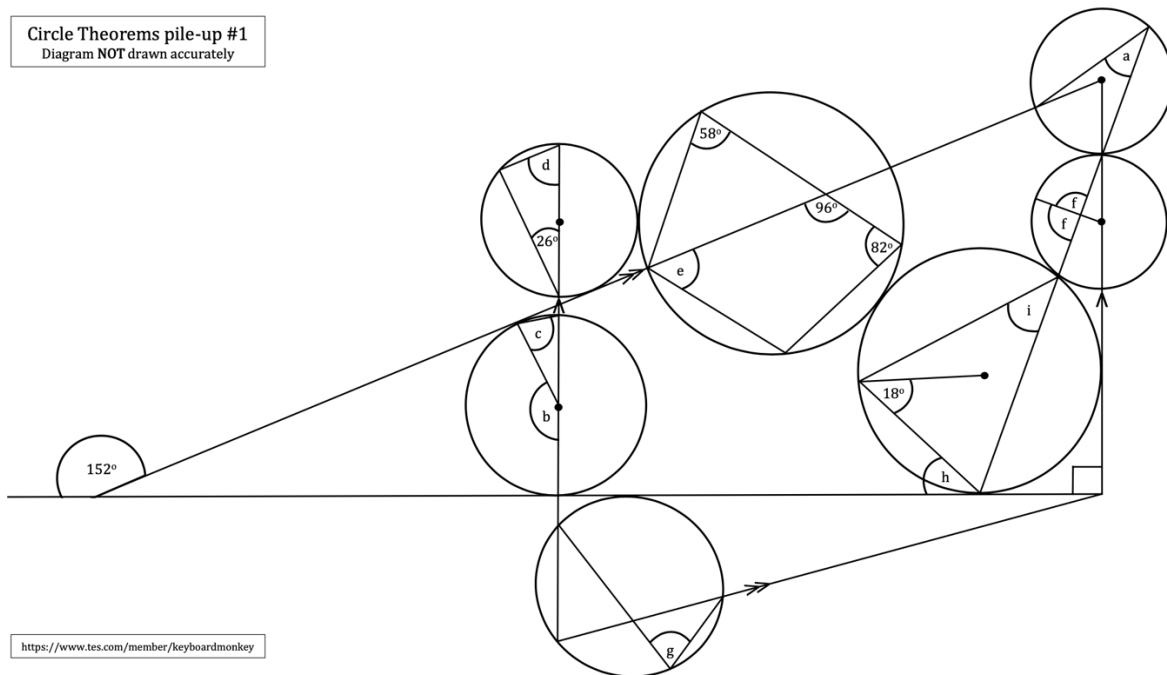
## Example

In triangle BCD, BC = BD.

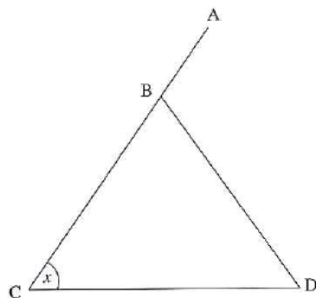ABC is a straight line.

A

B

C $x$

D

**Figure 6.7**

Prove that angle ABD = 2$x$.

AP is a tangent that touches the circle at P.
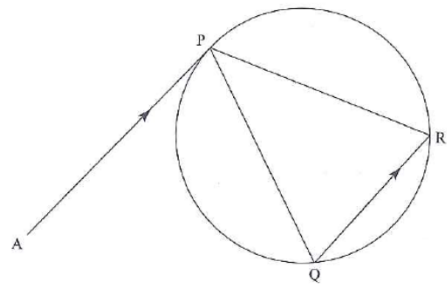
AP is parallel to QR.

P

R

A

Q

**Figure 6.8**

Prove that triangle PQR is isosceles.

1

# Task

PQRS is a cyclic quadrilateral.

C is the centre.
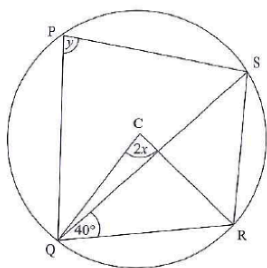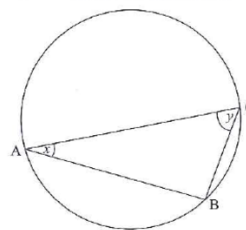
Angle QPS = $y$      Angle QCR = $2x$      Angle SQR = $40°$
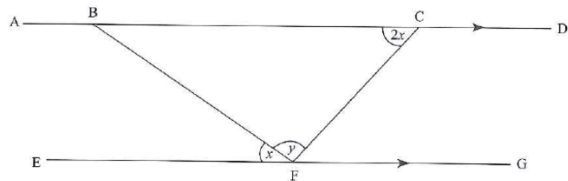


**Figure 6.9**

Prove that $y = x + 40$.

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1   AC is a diameter. B is a point on the circumference.
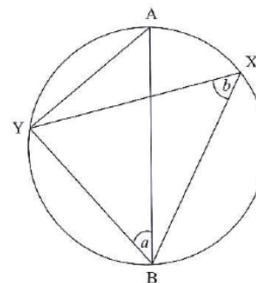


Prove that $x = 90 - y$.

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2   ABCD is parallel to EFG.



Prove that $3x + y = 180$.

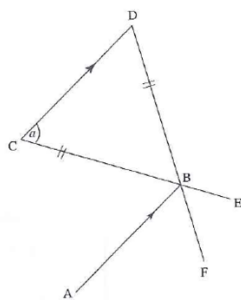---

3   AB is a diameter. X and Y are points on the circumference.



Prove that $a + b = 90$.

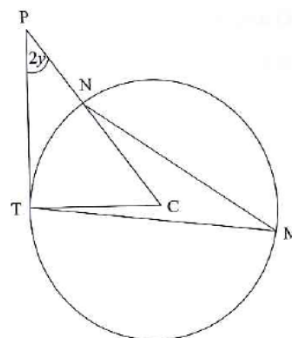**4** CBE and DBF are straight lines.

CD is parallel to AB.

BC = BD

Prove that angle ABC = angle ABF.

**5** PT is a tangent, touching the circle at T. C is the centre.
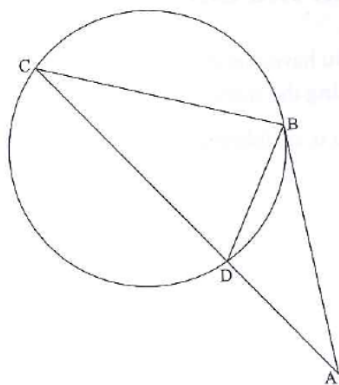
M and N are points on the circumference.

Prove that angle TMN = 45 − y.

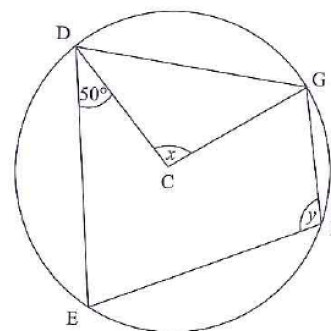**6** AB is a tangent, touching the circle at B.

ADC is a straight line.

AB = BC

Prove that triangle ABD is isosceles.
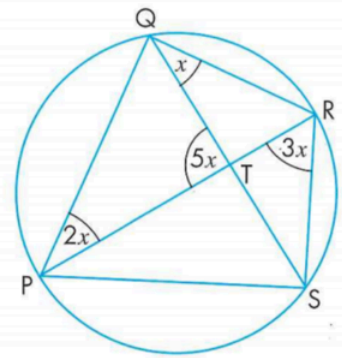
**7** DEFG is a cyclic quadrilateral.
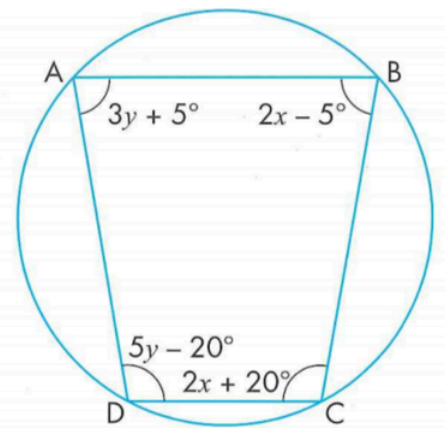
C is the centre.

Prove that x = 2y − 80.

PQRS is a cyclic quadrilateral. PR and QS meet at T.

**a** Work out the value of $x$.

**b** Show that the angles of the quadrilateral and angle STP form a number sequence.



ABCD is a cyclic quadrilateral.

Work out the values of $x$ and $y$.



On the diagram, O is the centre of the circle.
Angle BAC = $x$ and angle CBO = $y$.

Prove that $y = x - 90°$, giving reasons in your working.



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